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MEMORANDUM

TO: Tom Lorz, CRITFC

FROM: Jerry McCann

DATE: February 11, 2016

SUBJECT: Review of 2015 Updated Transportation COP

Based on a request from CRITFC, FPC reviewed the USACE *Transportation Configuration and Operations Plan, 2015 Update*, hereafter referred to as the TCOP.

General Comments

The TCOP presents serious concerns including:

- The recommended alternative for transportation relies on unproven technology and techniques.
- The conclusions reached are beyond the scope of the data collected and analyzed.
- The data analyzed is out of date, potentially leading to erroneous conclusions.
- The costs associated with the recommended alternative for transportation are grossly underestimated.

The TCOP has concluded that the recommended alternative for transportation at Lower Snake River projects is one that uses a managed risk strategy that "seasonally manipulates collection proportions." This alternative proposes manipulating spill passage efficiency by shutting down the removable spillway weir (RSW) at Lower Granite Dam (LGR) to increase the collection of hatchery steelhead. This approach would also then rely on the separation of large steelhead from smaller salmonids—a method which has not proven successful to this point despite many years of experimentation.

The suggestion that spill manipulation is an acceptable alternative based on the data presented stretches the original purpose of the data beyond its intended scope. Originally, the data developed for seasonal analysis of SARs, as presented by NOAA to the regional managers, was to determine what to do with fish that were already collected. This new alternative seeks to increase collection by manipulating spill. That type of trade-off, spillway passage versus collection and transport, goes beyond the scope of the analyses presented here and requires a new type of data analysis that could directly compare non-bypassed to transported fish, in order to be able to evaluate the two migration options. The best available technology might well be using spillway PIT-tag detection. Comparing SARs of fish released above LGR and detected in the spillway, to SARs of fish transported at the same time would make for a more representative comparison instead of relying on bypassed fish and then applying a C0 correction factor as NOAA has done in the analyses presented in this document. As such the use of bypassed fish and/or fish marked at LGR dam are not suitable for evaluating this type of operational tradeoff.

The TCOP states repeatedly that the document should be updated continually. However, for nearly all groups SAR data are available only through migration year 2010, despite the fact that data are currently available for 2 to 3 more years for most groups of salmon. This is important because decisions based on the outdated information presented could be misleading to fisheries managers. For example, hatchery sockeye SAR data were presented only for migration year 2009. However, data could be analyzed through migration year 2013 for these groups. In this case, using only 2009 would suggest transportation would be favorable for sockeye, but by including more recent years, it appears that transportation is not beneficial for those groups. And, for hatchery fall Chinook, data presented by the CSS included information through migration year 2012, 2-salt returns. The TCOP document includes data only from years 2006 and 2008 and concludes that transport shows "little benefit." CSS findings suggest that there is no benefit to transporting hatchery fall Chinook during the period May to mid-July based on data from six years (2006, 2008, 2009, 2010, 2011 and 2012). The CSS found 12 study cohorts had TIRs significantly less than 1 (indicating in-river migrants returned at a higher rate than transported fish) and only five cohorts were found to have TIRs significantly greater than 1, (indicating a transport benefit). Many of the 12 in-river cohorts that were found to significantly benefit from in-river migration were from the most recent years and were not included in the TCOP.

The costs of barge operations are underestimates of the total cost of barging. The document lists seasonal operating costs for the barges, operating costs for the bypass systems, and presumably maintenance costs for equipment. However, in order to carry out the preferred alternative, the TCOP states that it is mandatory to make changes to the bypass system at LGR. Costs for those improvements were not included in the costs of transportation and would greatly increase the estimated costs.

Specific Comments

Page ES-2.

Alternative 4 (recommended) relies on temporal data patterns that are biased because they rely on bypassed fish as well as fish marked at LGR. In addition, the operational changes that are

being considered to implement Alternative 4, including RSW shutoff, have not been approved by fisheries managers. Increasing the transport of steelhead by terminating the operation of the RSW for part of the season has negative consequences for wild spring/summer Chinook, sockeye, and hatchery subyearling Chinook based on CSS analyses, and is not considered in the TCOP.

Page ES-2.

The Key Recommendations for summer continue to support summer transportation despite recent data from CSS suggesting that TIR data show no benefit to hatchery subyearling fall Chinook typically transported in May to mid-July. The document states that more data are needed, but the report included data only from 2006 and 2008 migration years. The CSS analyses also consider data from 2006 to 2012 migration years.

Page ES-2.

Section ES1.2 states that, "it appears desirable to install a juvenile fish size separator at Lower Granite Dam, but…the ability to separate fish of different sizes…needs to be demonstrated." This statement seems to cast doubt on the entire notion of being able to seasonally target steelhead for transportation without causing harm to other species. Size separation has not proven successful despite many years of research.

Page ES-3. Section ES3.

Under critical uncertainties and required research, USACE identified the need for continued research into the seasonal effects of transporting steelhead and Chinook salmon. It is unclear why sockeye are not included. The data developed for estimating seasonal SARs to date, relies on either fish bypassed or released at LGR. Neither of these groups are representative of the run at large, and each are biased. The development of PIT-detection in LGR spillways would be essential for answering this question. However, spillway detection still has not been implemented despite years of design and development.

Page ES-3. Section ES4.

USACE recommends that the TCOP "be updated on a regular basis to include the most relevant transport data. In this way, adaptive management can be applied." The data presented in this report are not updated with the most recent available data, and because of this it precludes the ability to adaptively manage transportation based on the most recent data. (See general comments above for examples of how the lack of data affects decision making.)

Page 1-2, section 1.4.1 Objectives: "Define the juvenile transportation program baseline condition for ESA-listed anadromous fish."

As stated previously, the most recent available data should be used.

Page 1-2, section 1.4.1 Objectives: "Determine when, and at which projects, transportation is most likely to benefit ESA-listed fish."

To date the methods to determine seasonal transportation benefits rely on fish bypassed or marked and released at LGR (or other transport dams). Due to the known bias associated with

this methodology, it would be preferred to rely on PIT-tag detection of spillway-passed fish marked above LGR.

Page 1-3, section 1.4.1 Objectives: "Provide sufficient information to inform decisions on transportation…"

Again, the data sets currently relied upon for seasonal SARs do not represent non-bypassed fish. Spillway detection would be the best method to evaluate transport versus in-river passage, especially when considering alternative operations (i.e., spill/RSW reduction). Furthermore, the data sets that are being used must be updated to include more recent migration years since, bias aside, the data for years 2010 through 2013 migration years would likely change conclusions for several analyses.

Page 1-4, bullet 6.

It is unclear what "implementable in the foreseeable future" means. Would this preclude analysis of adult returns after migration year 2015? And what transport actions are achievable by 2018? Separation by size and direct barge loading at LGR do not seem implementable in this timeframe. Nor would data be collected in sufficient amounts to evaluate those projects as specified in this bullet. The document does not define what portion of this TCOP would be implementable and also could be adequately evaluated in the next two years.

Page 1-6, partial paragraph 1.

The following quote taken from the 2007 Biological Assessment and restated in the TCOP is of concern: "Post release survival of juvenile fish transported is anticipated to increase in response to the addition of barges by facilitating operations including direct loading, reduced densities, alternative release scenarios, and the ability to maintain species (size) separation." None of these strategies has been shown to improve survival of transported fish. In fact some have already been proven ineffective, such as alternative release scenarios and species separation.

Page 1-8, last paragraph.

It is not clear why the 2014 Supplemental BiOp chose to change the transport start date to April 25 (without a TMT consensus recommendation as in past years), nor was it adequately described how the target proportion or number of juvenile steelhead to be transported was determined. The TCOP recommendation does not address the negative effect this would have on other species transported at higher proportions during that time period, such as sockeye, wild spring/summer Chinook, and fall Chinook. The impact to other populations may be assumed to be low in the TCOP as a result of the failure to consider all available information.

Page 1-9 section 1.6.

The TCOP states in Page 1-4, bullet 6, "Any specific actions implemented as a result of suggestions contained in this document would require project-specific environmental compliance review and documentation, as well as additional Section 7 consultation with both NOAA Fisheries and the US Fish and Wildlife Service (USFWS)." It appears unlikely that any proposed actions would meet the criteria of being implementable and testable by 2018.

Section 2 beginning on page 2-1.

The analytical approaches listed are not adequate to address seasonal operational changes, such as spill reduction or RSW shutdown to reduce steelhead SPE. In addition, more recent data are available from all these data sources than were presented in this document. For example, the CSS 2015 Annual Report has been available since November 2015 on the FPC website. It includes TIR data through migration year 2013 for hatchery and wild yearling Chinook.

Page 2-3 (bias associated with T:B data).

Previously, NOAA has limited inference regarding T:B data to the question of what to do with fish in the bypass. However, in other parts of this document these data appear to be used to suggest changing operations to affect SPE for steelhead (such as shutting the RSW at LGR—see last paragraph on page 3-8). This application is beyond the scope of the data.

Page 2-8 Section 2.3, second paragraph.

This paragraph seems to argue for a May 1 transport date at the earliest. And yet the 2014 supplemental BiOp stated that transport would begin April 25, whenever a consensus proposal was not reached in TMT. This seems like a contradiction and it appears that it is inappropriate to set the default start date prior to when the data suggests it is beneficial. In fact, in the most recent NOAA assessment of the best start date for transportation (AFEP 2015 Annual Review abstracts) the date is assessed as May 10.

Page 2-8 Section 2.4.

Updated analyses of fall Chinook from CSS are available through migration year 2012 (2012 SARs include 2-salt returns). In our experience, particularly for hatchery and surrogate tag groups, the patterns in TIRs do not change greatly with the addition of adult returns beyond 3-salt. Therefore, the patterns seen in the 2012 migration year are likely to hold as more adult data are collected. Very few adult returns beyond 3-salt have been recorded from Snake River transportation study fall Chinook PIT-tag cohorts. The TCOP includes data from only migration years 2006 and 2008 and assumes a benefit of transportation for fall Chinook. However, the inclusion of data from more recent years demonstrates that transportation is a detriment for Snake River fall Chinook—especially migrants represented by the PIT-tag cohorts that typically migrate between mid-May and mid-July. (See the FPC introductory comments regarding CSS findings related to fall Chinook above in this review.) The TCOP cites an ISAB review of the 2012 CSS report, regarding the benefit of transportation. However, the CSS 2015 report (containing three years of additional data) has been available since November 2015. That report includes findings from a total of six years (2006, 2008, 2009, 2010, 2011 and 2012). In that report the CSS concluded, “Based on TIRs of adult returns to LGR it appears that the juvenile smolt transportation program does not mitigate for the adverse impacts of the operation of the FCRPS on fall Chinook groups that we analyzed.” Again, the TIR data showed 12 cohorts with TIRs significantly less than 1 (indicating negative transport effects), while only 5 had TIRs significantly greater than 1 (indicating positive effects from transport). The preliminary data from migration year 2012 show continued poor performance of transport cohorts with 7 of 9 TIRs below 1 (two were significant). These newer data (i.e., beyond 2008) provide more thorough data suggesting that transport was not beneficial for Snake River fall Chinook that typically out-migrate between mid-May and mid-July.

Page 2-12 Section 2.5.1.

The section on transportation of sockeye should be updated. With only 2009 data available in the TCOP those using this document could be misled into thinking transport of sockeye has been shown to be beneficial. The CSS 2015 Annual report lists four years of sockeye data. Only 2009 shows TIRs above 1 for sockeye releases. The other available years (2011, 2012 and 2013) show TIRs less than 1 for both Sawtooth and Oxbow release groups. In addition, an analyses of adult sockeye returns (FPC 2015) showed transport adults have performed more poorly in terms of adult success once detected at Bonneville Dam (see figure below excerpted from the FPC adult sockeye analysis). Analyses also suggest that transported sockeye are more likely to stray outside of the Snake River basin than those that migrated in-river.

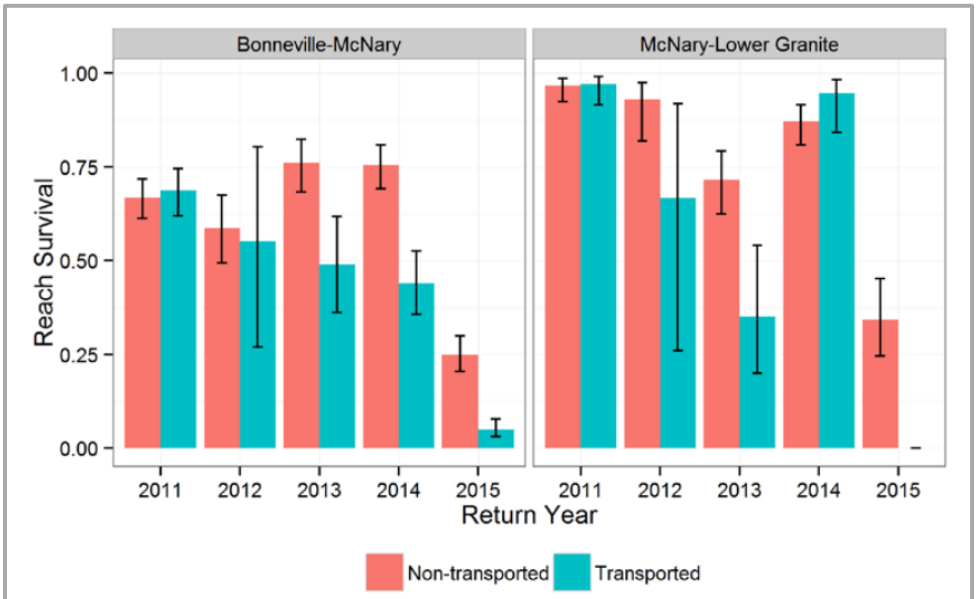
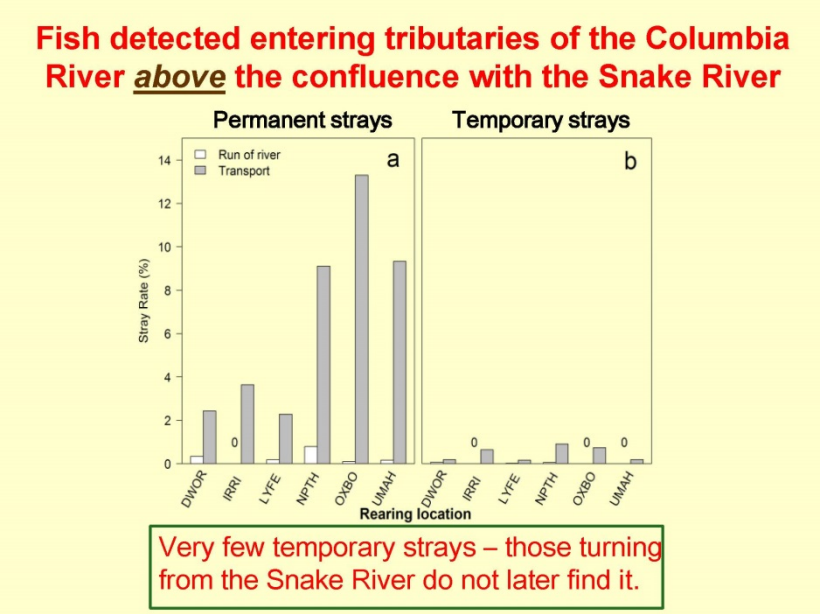


Figure 8. Snake River sockeye adult survival (95% confidence interval), from Bonneville to McNary, and McNary to Lower Granite Dam by return year and migration history.

The figure above was excerpted from FPC analysis of adult sockeye returns. The document is available on FPC website at: www.fpc.org/documents/memos/159-15.pdf. Providing more updated information on the effects of transporting sockeye is warranted to meet the objective of providing all the relevant information, as well as the stated goal of continually updating the TCOP with new information.

Section 2.6.1.

Information on sockeye mentioned above would also be applicable to Section 2.6.1., since this section refers to information on the effects of transportation on adult straying. Further, NOAA presented findings on Fall Chinook straying at the 2014 AFEP review in relation to migration history (transport versus in-river) and has shown that adult fall Chinook that were transported stray at a much higher rate than those that migrate in river as juveniles (see the figure below).



The above figure was excerpted from the Bond et al. presentation from the 2014 AFEP Annual Review.

Bond et al. 2014 reported that the odds of transported fish straying above Snake River compared to in-river migrants ranged from 10:1 to 21:1, depending on the transportation site. Bond et al. concluded that high rates of temporary straying below McNary Dam for Snake River fall Chinook were related to juvenile transport as well as ocean age and some environmental factors; while permanent straying above the Snake River was correlated primarily with transport. That information, now two years old, should be included in this TCOP. Updating data on fall Chinook and sockeye should be a high priority and would make the findings from these analyses more useful to fisheries managers.

Page 2-15 Section 2.6.3.

Again, updates and more complete information would make this segment more applicable. The TCOP refutation of Tuomikoski et al. 2010 relies on data from Faulkner et al. 2012. The TCOP rejection of the relationship between TIR and reach survival from LGR to BON presented in Tuomikoski et al. 2010, relies on removing migration year 2001 from the Faulkner et al. 2012 data set (that data set spans the migration years 2000 to 2011). However, as shown in Table 2-14 of the TCOP, in addition to removing migration year 2001, Faulkner et al. 2012 was also missing data for 2004, 2005, 2010 and 2011. The TCOP analysis relies on 7 years of data for steelhead and 9 years for wild Chinook, when 2001 was excluded. In contrast, the CSS analysis available in the 2015 report uses data from 1994 to 2013.

Using the most recent CSS data set and analysis from the CSS 2015 Annual Report, we estimated the significance of the TIR versus in-river survival using the model identified as the best fitting model in the CSS 2015 Annual Report. After removing the 2001 data, as was suggested in the TCOP, the model had an r-squared of 0.498 and a p-value of < 0.00002, suggesting a highly significant relationship exists between TIR and in-river reach survival from LGR to BON despite removing the 2001 migration year.

Page 2-18 Section 2.6.5.

No data set currently supports this analytical approach. The addition of spillway PIT-detection could greatly improve the information necessary to make these types of in-season management decisions.

Page 2-19 Section 2.6.6.

Table 2-15 underestimates the total cost of transportation. The preferred alternative identified in the TCOP includes requirements for the addition of size separation capabilities as well as direct barge loading at LGR. Neither of these capabilities is available at LGR presently, and the new construction which presumably provide these options, will add up to $40 million in construction costs, in addition to the annual operations costs shown in the table.

Page 3-6 Section 3.1.4.

Again altering "stock-specific collections…across the season" requires manipulating spill to increase collection of target populations. That type of management action is beyond the scope of the present data and analyses and would require some new source of monitoring data, such as spillway PIT-tag detection, to properly weigh the alternative risks.

Also, increasing collection for steelhead in mid-May could adversely affect sockeye and subyearling fall Chinook migrating at the same time. The document does not define how decisions will be made. For example, what is the targeted proportion of the steelhead for transportation and how was that derived?

Page 3-7 Figure 3-1.

Using daily collection numbers as the y-axis emphasizes the timing of the most prevalent species. Hidden within the mid-May data for steelhead and yearling Chinook are collections of sockeye and subyearling Chinook. If the data were expressed as the daily percentage of total seasonal collection rather than as absolute numbers, it would better show the timing of fall Chinook and sockeye and would demonstrate the impacts of the proposed steelhead transportation operation to both species.

Page 3-10 Section 3.3.1.

There is no mention of the ongoing efforts to install spillway PIT-tag detection capability at LGR. This seems like a large oversight, since providing that capability would greatly improve the applicability of the monitoring results to management decisions.

Marking for transportation studies using fish collected at LGR should be discontinued. Biases have already been identified in these data. It is unclear why this study design continues.

References

Bond, M., P. Westley, A. Dittman, T. Quinn, T. Marsh, and D. Holecek. 2014. "Analysis of straying rates and behaviors of Snake and Columbia River salmon and steelhead." Presentation at the Anadromous Fish Evaluation Program (AFEP) 2014 Annual Review. Portland, Oregon, December 2014. Available at www.nwd-wc.usace.army.mil/tmt/documents/FPOM/2010/2014_AFEP/AFEP-2014_TransportationStudies.pdf

Faulkner, J.R., S.G. Smith, W.D. Muir, D.M. Marsh, and R.W. Zabel, 2012. Survival estimates for the passage of spring-migrating juvenile salmonids through Snake and Columbia River dams and reservoirs, 2011. Northwest Fisheries Science Center Final report to Bonneville Power Administration (Project # 199302900).

FPC. 2015. Memo dated October 28, 2015, regarding Requested data summaries and actions regarding sockeye adult fish passage and water temperature issues in the Columbia and Snake rivers. Available at: www.fpc.org/documents/memos/159-15.pdf.

Tuomikoski, J., J. McCann, T. Berggren, H. Schaller, P. Wilson, S. Haeseker, J. Fryer, C. Petrosky, E. Tinus, T. Dalton, and R. Elke. 2010. Comparative Survival Study (CSS) of PIT-tagged Spring/Summer Chinook and Summer Steelhead, 2010 Annual Report. Project No. 199602000. www.fpc.org/documents/CSS/2010%20CSS%20Annual%20Report--Final.pdf